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A Journey from Reductionism in Neuroscience to Reductionism in Psychiatry

Fahimeh Mianji[1]

[1] Doctoral Fellow of the Global Health Research Capacity Strengthening (GHR-CAPS), Department of Psychiatry, McGill University, Montreal, Canada

Letter to Editor

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Dear Editor-in-Chief, I was motivated to review the relevance of the most representative philosophies of mind and mind-body theories/problems for three reasons. The first reason was the journal's objections to body-mind-culture arguments. The second was its current issue's articles, particularly a report on an introductory workshop focusing on a critical philosophical reflection on medical schools and its importance in medical research and practice. The final reason was a recent workshop on critical neuroscience that I attended. Based on the recent controversies over cognitive neuroscience and the initiative of critical neuroscience as a framework founded by, among others, Suparna Choudhury, I will briefly talk about the relationship of the mind-body problem with neuroscience and how this concept is applied in psychiatry practice.

For centuries, philosophy, religion, psychology, and cognitive science have tried to develop an understanding of the nature of the mind. As a branch of philosophy, philosophy of mind focuses the key issues of the nature of the mind, the relationships between mind/mental phenomena and body/physical phenomena (i.e., mind-body theories), and how thought, feeling, perception, action, and other mental phenomena are related to the events in the human nervous system (i.e., the mind-body problem. Mind-body theories and the mind-body problem, the core subject matter of the philosophy of mind, suggest different perspectives on understanding the relationship between mental phenomena and physical phenomena. Mind-body theories break down into two broad categories (monistic theories and dualistic theories) and several subcategories that are all concerned with the relationship between mental and physical phenomena (Jaworski, 2011).

Monistic theories claim that mind and body are different aspects of the same entity; in other words, there is fundamentally one kind of entity. However, different theories of monism, including mental, physical, and neutral monism, have different views on what that one kind of entity is (Figure 1). Mental monism, also called idealism, claims that fundamentally everything is mentally constructed or otherwise immaterial and can be described and explained

Corresponding Author:
Fahimeh Mianji
Email: fahimehmianji@gmail.com

using prescientific psychological concepts such as belief, desire, and feeling. The Hindu idealists in India and the Greek Neoplatonists in the 4th century CE made the earliest arguments that the world of experience is grounded in the mental drive. In 18th-century Europe, idealism was revived by a subjective idealist, George Berkeley, who was an anti-realist in terms of a mind-independent world (Fogelin, 2001). In the 19th century, Immanuel Kant claimed that according to idealism, "the reality of external objects does not admit of strict proof. On the contrary, however, the reality of the object of our internal sense (of myself and state) is clear immediately through consciousness" (Kant, & Guyer, 1999).

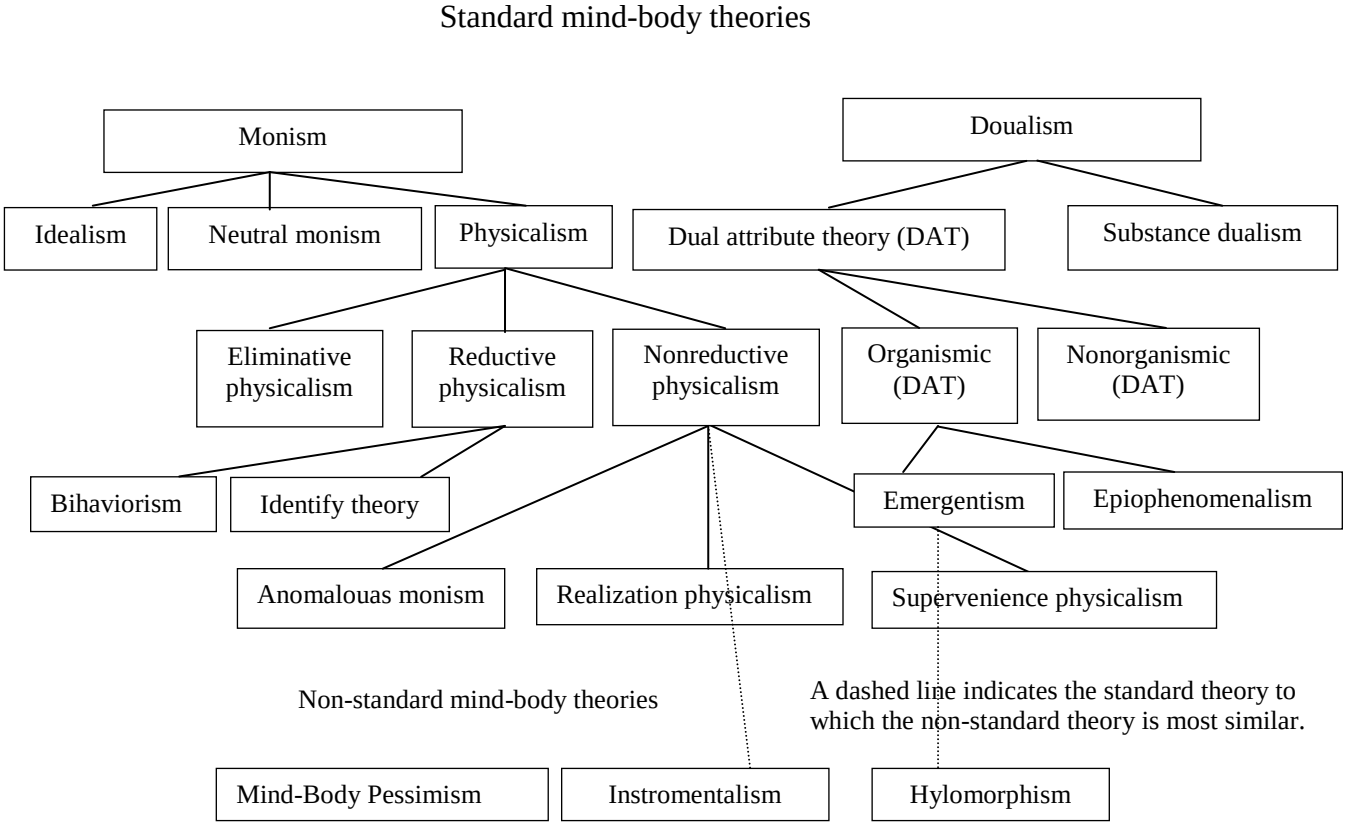

Figure 1. Standard and non-standard mind-body theories **(**Jaworski, 2011 Philosophy of Mind: A Comprehensive Introduction**)**

In contrast, physical or material monism, also called physicalism, claims that everything is fundamentally physical and that all phenomena, including mental phenomena and consciousness, can ultimately be described and explained by material interactions or physics. All three broad types of physicalism, including eliminative, reductive, and non-reductive physicalism, rely on the descriptive and explanatory power of science that is driven by past scientific success. However, these different theories of physicalism differ in terms of the legitimacy of conceptual frameworks such as ordinary psychological discourse. Eliminative physicalism claims that mental phenomena do not exist; in other words, in reality, psychological discourses, such as beliefs, desires, hope, joy, and pain, correspond to nothing. However, on the other hand, reductive and non-reductive physicalists give legitimacy to mental

phenomena and do not deny the existence of beliefs, desires, and other psychological discourses. These groups of physicalists, who are the majority of physicalists, claim that all these psychological discourses are really physical states such as the states of the brain. and mental and physical conceptual frameworks are two different frameworks that describe and explain the same set of physical phenomena. Reductive physicalism (behaviourism and identity theory), driven by Smart's and Feigl's materialism in the late 1950s, suggests that all special sciences (e.g., biology, chemistry, biopsychology, and economy) and not strictly scientific discourses, such as ordinary psychology, would eventually be reduced to physics (Jaworski, 2011). Current debates on the body-mind problem originated in two classic papers; Herbert Feigl's "The Mental and The Physical," published in 1958, and J.J.C. Smart's "Sensations and Brain Process," published in 1959. The approach that they proposed to the nature of mind became the basis of what is now called the mind-body identity theory, central-state materialism, the brain-state theory, or type (reductive) physicalism (Kim, 2000).

Reductive physical (here, identity theory) theories dominated philosophy of mind for many years. Nevertheless, they were criticized by opponents of the identity theory, such as supporters of multiple realizability theories and functionalism, a theory of mind based on the computational model of psychological discourse. These supporters formed the basis of a new type of mind-body theory (non-reductive physicalism) which has at least three subcategories, including realization physicalism, supervenience physicalism, and anomalous monism. Donald Davidson was the first to describe a broadly non-reductive physicalist approach by using the term "supervenience" in the 1970s. According to supervenience, mental phenomena supervene on physical phenomena. Davison stated that "supervenience might be taken to mean that there cannot be two events alike in all physical respects but differing in some mental respects, or that an object cannot alter in some mental respects without altering in some physical respects" (Davidson, 2001). Based on realization physicalism, mental phenomena are realized by physical phenomena. In general, like other categories of physicalism, non-reductive physicalism claims that everything can be described and explained by physics; however, it legitimizes many different ways of describing physical reality. According to non-reductive physicalism, since the special sciences (such as psychology, economy, and sociology) are more abstract than fundamental physics, even though these sciences are related to physical individuals, properties, and events, they cannot be reduced to physics. The special descriptive and explanatory interests of special sciences cannot be fulfilled by the conceptual resources of physics, but can be satisfied using the mentalistic description. Finally, anomalous monism/physicalism claims also that everything is physical; however, it differs from other theories of physicalism in its ontology and its account of psychological language. For example, anomalous monism theory is contrasted with substance-attribute theory ontologically. According to the substance-attribute ontology, events are distinguished by their constituent individuals, properties, and times. However, based on the anomalous monism ontology, events are distinguished by their causes and effects. According to this anomalous theory, all events are physical; however, we can use different vocabularies (physical or mental) to describe physical events. In other words, mental events are physical events that are described by mental vocabularies. In addition to ontological difference, anomalous physicalism has a different account of psychological language. Psychological discourses are anomalous and interpretive; this means there is no strict law to connect the mental description to the physical description. We use mental description to interpret someone's behaviour, to rationalize

that behaviour. Because of the difference in the interests that mental and physical descriptions imply, psychological discourse cannot be reduced to the physical theory. In other words, physics cannot take over the descriptive and explanatory roles rooted in psychological discourse (Jaworski, 2011). Physicalism has become the most popular part of body-mind theories and has dominated the philosophy of mind for more than five decades.

Another side of mind-body theories is dualism, that is, the mind and body are not identical. Dualism theories are associated with René Descartes, who, for the first time, claimed that the mind is a nonphysical substance, a claim that created the contemporary form of mind-body problem. He clearly distinguished mind (consciousness and self-awareness) from brain (the seat of intelligence). Dualistic theories claim that we cannot describe and explain mental and physical phenomena by using a single conceptual framework. Individuals can have two fundamentally distinct kinds of properties; mental properties that need a mental framework to be described and explained vs. physical properties that need a physical framework to be described and explained.

There are two broad theories within the dualistic theories; dual-attribution theories and substance dualistic theories. While both of these theories perceive mental properties and physical properties as two different unrelated entities, they differ in terms of the different properties that an individual can have. According to dual-attribution theories, an individual can have both mental and physical properties, but substance dualistic theories deny this claim. The latter believe that there are two different individuals; those with mental properties and those with physical properties. Persons (you and I) are only mental beings without any physical properties, and persons' bodies (human organisms) are purely physical. Due to this claim that the mind and body are two fundamentally distinct kinds of entities, substance dualistic theories are contrasted with all forms of monism. However, not all dualistic theories are contrasted with all forms of monism. In fact, some forms of dual-attribution theories are considered forms of non-reductive physicalism since both deny that the special sciences can be reduced to fundamental physics. If we consider the mind-body theories in a spectrum, dual-attribution theories stand somewhere between substance dualism and physicalism (Kim, 2000; Jaworski, 2011).

In addition to the standard form of mind-body theories, there are three more theories that fall outside of this monism-dualism category. these theories consist of instrumentalism, mind-body pessimism, hylomorphism. Instrumentalism denies a realistic understanding of psychological discourse. Mind-body pessimism denies the possibility of describing and explaining how mental and physical phenomena are related. Hylomorphism denies that human behaviours can be accurately described and explained through the mind-body distinction. Hylomorphism theory differs significantly from most forms of mind-body theories due to its claim that mental states are patterns of social and environmental interactions and involve social and environmental factors. Patterns might integrate with physical states, such as the states of the nervous system. However, they are essentially embodied and cannot be described and explained independently of specific human bodily parts and the environments and communities in which humans live. Finally, according to the hylomorphic view of embodiment, because thoughts, feelings, perceptions, and actions, and the substructures and subjectivity they compromise, are essentially embodied, they cannot be described and explained as non-physical phenomena. Therefore, high-level human activities are described as social, psychological, biological, and also physical phenomena (Jaworski, 2011).

Through this brief review of body-mind theories, I hope the next part of this essay, which

aims to explain the place of neuroscience within mind-body theories and the way that these theories apply to psychiatry, is better understood.

As previously explained in this essay, the radical proposal suggested in the late 1950s and early 1960s that the mind is no more than the function of the brain established the reductionist physicalism theory of mind-body theories. By reductionism, philosophers refer to the claim that because the mind is in the brain and the science of the brain is neuroscience, the science of the mind is also neuroscience, and therefore, neuroscience can explain mental life. Furthermore, if we want to understand mental life, the place would be just the brain. When a particular theory takes over the explanatory effort, that explanatory model is reduced to the new theory. Outside neuroscience, there are only a few examples of reductionism, for example, the way in which molecular biology takes over the explanation of inheritance from Mandelian genetics. In this example, the first model (explanatory efforts), Mandelian genetics, has been reduced to molecular biology. According to Ian Gold, the Canada Research Chair in Philosophy and Psychiatry at McGill University in Montreal, although psychology has not been completely reduced, the consequences of this idea that neuroscience will explain all we need to know about the mind will eventually reduce psychology to neuroscience. Even though, in fact, there is not enough scientific evidence to prove that neuroscience as it is now or will be in the near future will ever be able to explain high-level mental phenomena such as poetry or learning. In his paper, "Reduction in Psychiatry," Gold emphasizes that reduction in neuroscience is not impossible, but the claim that psychological phenomena arise because of the way that the brain is, and so, we expect to understand psychological phenomena in terms of the brain is a claim about science. Moreover, his claim depends on a huge range of notions, such as what scientists have actually discovered and what human beings are capable of discovering. Relying on claims such as "We know that mind is the brain" (Hooker, 2002) and on Insel's notion that neuroscience will tell us what psychopathology or consciousness is (Insel, & Quirion 2005) would have a serious scientific consequence because it implies that we know where science will go. However, saying that it is a mistake to predict the future of science without robust actual scientific findings does not mean that investing in neuroscience research is a mistake. Gold emphasizes the role of neuroscience as an essential part of the theory of any psychological phenomenon, but this does not mean that neuroscience has told or will tell us all or even most of the story about psychological phenomena. It may or it may not. The mistake is claiming that investing in any other approach is just performing placeholder science (e.g., investing in other kinds of research such as psychology would be assumed as investing in the soft side of a real thing, and therefore, it should not be done). Sooner or later cognitive neuroscience will act as a reducing theory for psychiatry, and will eventually provide an exhaustive explanation of mental illness and form the basis for treating it successfully (Gold, 2009). A clear example of this is Thomas Insel's and Remi Quirion's claim that psychiatry is a discipline of "clinically applied neuroscience," a kind of psychiatry that relies mainly on genetics and neuroimaging research (Insel, & Quirion, 2005). This, in fact, proposes that a mental illness will ultimately be understood and treated by a successful theory of the brain. However, this epistemological reductionism was challenged by Kirmayer and Gold (2012). They argued that "one cannot understand mental illness without reference to social causes of mental illness, then no theory that is exclusively about the brain can be complete." They believed that behind their enthusiasm for neuroscience as a foundation for psychiatry is a reductionistic view of the origins and nature of human behavior and experience as rooted in neurobiology. This neuroreductionism

seems attractive and even compelling for several reasons. First, the technologies of neuroscience have made the activities of the brain visible in new and vivid ways. Second, in some instances, neuroscientific research has generated partial explanations for specific symptoms, diseases, or disorders. Third, in the social sphere, neurobiological explanations for mental illness have been embraced by many because they shift causality away from human agency, and so, work to exculpate individuals and their families as the causes of their own suffering. Forth, the biological turn has been heavily promoted with many inflated claims because this serves powerful interests in the pharmaceutical industry. Fifth, more broadly, the emphasis on neurobiology diverts attention from social, structural, and economic factors that are politically contentious. Ultimately, neurobiological reductionism in psychiatry serves a larger ideology that locates human problems in our brains and bodies rather than in our histories and social predicaments (Kirmayer, & Gold, 2012).

Finally, despite the fact that neuroscience has made dramatic progress in recent decades, promoting such reductionism in psychiatry has serious consequences for the explanatory models of psychological phenomena, the production of knowledge, and ultimately, for person-centered and integrative clinical practice. Responding to these concerns is one of the aims of critical neuroscience. It is hoped that critical neuroscience projects, as defined by their aim, trace the social origins and implications of neuroreductionistic claims, particularly as they are applied in psychiatry, and integrating the findings of those projects into new experimental and interpretive directions (Choudhury, & Slaby, 2011).

In the current era, scientific communities have continually stressed the necessity of interdisciplinary work in scientific research. They increasingly encourage the notion that any effort to understand human behaviors should situate the person's physical (brain) and mental world within his social and cultural world.

This summary shows that in line with the interdisciplinary orientation of IJBMC, the current issue assembles report, theoretical, review, and qualitative articles from different scientific conceptual and methodological approaches with one interest in common, the impact on medical education and practice. It is only through such interdisciplinary perspectives that science (not only psychiatry and psychology, but also philosophy and social sciences) enriches its findings. Thus, I hope that this international journal provides scholars from different corners of the world an opportunity to discuss psychological and behavioral phenomena from different cultural and disciplinary perspectives.

Note

1- My reading of these articles coincided with a workshop I attended on Critical Neuroscience offered by the 21st Summer School in Social and Cultural Psychiatry, McGill University. (https://www.mcgill.ca/tcpsych/training/summer#CRITICAL%20NEUROSCIENCE)

2- Critical Neuroscience brings together multi-disciplinary scholars from around the world to explore key social, historical and philosophical studies of neuroscience, and to analyze the socio-cultural implications of recent advances in the field. Original, interdisciplinary approach explores the creative potential for engaging experimental neuroscience with social studies of neuroscience. It also furthers the dialogue between neuroscience and the disciplines of the social sciences and humanities, transcends traditional scepticism, and introduces novel ideas about 'how to be critical' in and about science. (http://www.critical-neuroscience.org)

3- Suparna Choudhury is an assistant professor at the Division of Social and Transcultural Psychiatry, McGill University and an investigator at the Lady Davis Institute for Medical Research. She most recently directed an interdisciplinary research program on critical

neuroscience and the developing brain at the Max Planck Institute for History of Science in Berlin.

4- Ian Gold is the Canada Research Chair in Philosophy & Psychiatry at McGill University in Montreal.

Conflict of Interests

Authors have no conflict of interests.

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